

WHAT IS CLAIMED IS:

1. A linked electrical relay system adapted for use in a synchronous generator, the system comprising:

5 a electrical relay system in operative association with an electrical signal representative of an actual frequency at which the generator is operating and to an electrical signal representative of an actual forcing level at which the generator is operating, the relay system adapted to respond to the actual frequency signal and the actual forcing signal,

10 wherein the relay system compares the actual frequency signal with a predetermined desired frequency range and compares the actual forcing signal with at least one predetermined forcing level, and selectively alarms the operator or trips the generator to an off-line mode depending upon the comparison.

15 2. The linked electrical relay system of claim 1, wherein if the actual frequency signal is within the predetermined desired frequency range, then the relay system compares the actual forcing signal with a predetermined lower forcing level.

3. The linked electrical relay system of claim 1, wherein if the actual frequency signal is outside the predetermined desired frequency range, then the relay system compares the actual forcing signal with a predetermined upper forcing level.

20 4. A method for operating a synchronous generator, the method comprising:

25 providing a relay system adapted to respond to an electrical signal representative of an actual frequency at which the generator is operating and to an electrical signal representative of an actual forcing amount at which the generator is operating;

providing a desired off-nominal frequency range, a desired lower forcing amount,

and a desired upper forcing amount;

measuring an actual frequency at which the generator is operating, and

5 measuring

an actual forcing amount at which the generator is operating;

comparing the actual frequency with the off-nominal frequency range, and

comparing the actual forcing amount with the lower and/or upper forcing amounts;

and

10 selectively alarming the operator or tripping the generator to an off-line mode based upon the frequency comparison and the forcing comparison.

5. The method of claim 4, wherein the actual forcing amount is compared with the lower forcing amount.

6. The method of claim 4, wherein the actual forcing amount is compared
15 with the upper forcing amount.

7. The method of claim 4, wherein the actual forcing amount is compared with the upper forcing amount if the actual frequency is within the off-nominal frequency range.

8. The method of claim 7, wherein the generator is tripped to an off-line
20 mode if the actual forcing amount is above the upper forcing limit.

9. The method of claim 4, wherein the actual forcing amount is compared with the lower forcing amount if the actual frequency is outside the off-nominal frequency range.

10. The method of claim 9, wherein the operator is alarmed or the generator is tripped to an off-line mode if the actual forcing amount is above the lower forcing limit.

11. A synchronous generator, comprising:

5 an axially extending rotor enclosed in an annular stator that surrounds and
sleeves the rotor;

a frequency source signal in operative association with the rotor and stator representative of an actual frequency at which the generator is operating;

a forcing source signal in operative association with the rotor and stator

10 representative of an actual forcing amount at which the generator is operating; and

a relay system adapted to respond to the frequency source signal and the forcing source signal by comparing the actual frequency with a predetermined desired frequency range and comparing the actual forcing amount with at least one predetermined maximum forcing amount, and selectively alarming the operator or tripping the generator to an off-line mode depending upon the comparisons.